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An ecosystem simulation modelo for the northern Gulf of California

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The Northern Gulf of California is an important Mexican aquatic ecosystem both in terms of biodiversity and also in valuable fishing resources. Two highly endangered, endemic species inhabit the area and three Marine Protected Areas (MPAs) are already implemented. Some conflicts are evident between conservation and exploitation by multi-species and multi-sector fisheries. In this context, ecosystem trophic models coupled with temporal and spatial dynamics simulations are considered important tools to test temporal and spatial management alternatives in the fishing effort allocation. In this report, we show several ecosystem model results and describe the construction of the spatial ecosystem model considering today's fishing spatial allocation. Ecopath results highlight the role of the endangered species, top predators and fleets on ecosystem components. Ecosim outcomes show the effects of temporal fishing effort increments and decrements on the two endangered species. The simulation of no fishing illustrates the recovery potential of these species while the simulation of doubling fishing points up the risk of an even more drastic decrease of the biomass of the endangered species. Finally, the implementation of the Ecospace model permits a satisfactory representation of the known spatial distribution of the model components. This allows the setting of possible MPA scenarios in order to test the ecological effects of diverse spatial fishing allocation designs.

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